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AUTHOR Colven, Ronald
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ABSTRACT

Proceedings of a meeting of representatives from 13 countries on the effect of the physical environment on educational quality are summaried. Three major issues are addressed: (1) the effect of the physical environment on education; (2) successful school building characteristics; and (3) what can be done to maintain and improve the quality of existing buildings. It was concluded that, because education is a dynamic process, educational environmental management should be a continuous updating process. Successful facilities are characterized by clearness and quality of expression and support of the social aspects of children's development. Recommended changes in the planning process include preplanned adaptability; sensitivity to evolving needs; development of autonomous assessment systems; and active architect participation. Seven architectural drawings and three black and white photographs are included. (LMI)

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PROGRAMME ON EDUCATIONAL BUILDING

ED 92-91

PEB

THE QUALITY OF THE PHYSICAL ENVIRONMENT OF THE SCHOOL AND THE QUALITY OF EDUCATION

CONCLUSIONS OF A SEMINAR
HELD IN LIDINGÖ, SWEDEN
17-21 OCTOBER 1988

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Conclusions of a Seminar held in Lidingö, Sweden

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How do buildings affect education? What makes for a successful environment, and how should we design and construct schools accordingly? What can be done to maintain and improve the quality of existing buildings?

To discuss these questions, 35 people from 13 nations met in Stockholm towards the end of 1988. This is a report of that seminar. It outlines the main themes of the presentations, draws on summaries of group discussions and offers some conclusions. Some examples of buildings described at the seminar are provided.

Quality is difficult to define; it invites many interpretations and viewpoints. Nevertheless, participants at the seminar felt it was possible both to agree on some fundamental aspects of quality in educational building and to identify ways in which grounds and equipment, as well as buildings, can enhance processes and outputs in education.

This report was prepared by Ronald Colven of the Royal Institute of Technology (Tekniska Hogskolan), Stockholm, in co-operation with the Secretariat of the OECD Programme on Educational Building (PEB), on whose behalf it was edited for publication by Mike Duckenfield.

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Introduction

Common trends have shaped the development of school buildings in most nations. Initially, the classroom provided the focus for most school activities but, gradually, rooms came to be added for particular functions, such as handicrafts, physical exercise, eating and meeting. In some places, the building as a whole also served as a social focus for the local community.

The move to towns and the needs of expanding industry, together with the development of more organised programmes of learning, led to bigger and more complex buildings. This required greater attention to building rules so as to ensure safety and minimum standards. Such regulation coincided with the growth of government funding and, coincidentally, public accountability. Schools came to be regarded as institutions and, as such, tended to become more socially isolated.

In the last 40 years, new ideas and demands have altered this view. These include the diversification in teaching methods, curriculum developments - including those arising from the use of computers in schools, the political shift towards giving schools greater, decentralised powers and the desire to see schools, once again, as a community resource.

A further factor is demography - occasioning the building boom of the 1960s and the decline in enrolments thereafter. This has often meant that scarce financial resources have had to be commited to maintaining buildings rather than to improving them. Many hope that increased decentralisation of decision-making will allow local authorities and individual schools partially to overcome this problem, by setting their own priorities.

Improved communications and the efforts of international organisations are enabling similar experiences in different countries to be shared more freely. Common problems can be informed by a wider variety of possible solutions. The Stockholm seminar was part of this process.

I. How does the physical environment affect education?

Some general points

HIDDEN CURRICULUM

The school curriculum describes courses of study and includes aims and methods. The syllabus is a means to realise these, and it is still the syllabus that plays the main role in steering developments at many levels of the educational system. But much is learnt outside the formal curriculum. This incidental learning derives from many sources - and the influence of the physical environment of schools is one.

CONTINUOUS PROCESS

The operation of a school is a "dynamic, developing and continuous process. It serves different age groups and provides for different activities. It must provide for investigation, experiment, exploration and play. It must be a learning environment which helps to raise the living quality".

This theme was taken up by several seminar participants. One working group felt that "environmental (and educational) improvement is not a finished product but a process". They underlined the importance of developing an educational policy whereby evaluation could make social assessments as well as technical (educational) ones.

Another group argued for 'school development plans' in which "short and long goals are defined and which are capable of further adaptation and refinement, year upon year, as circumstances change". Such plans would continually evaluate the relationship between the goals set and school buildings, having regard to those factors recognised as contributing to a good educational framework as well as to a beneficial physical environment.

PUPIL PERSPECTIVE

Despite the widespread interest in the impact of schools as institutional environments on the long-term development of pupils, there has been little study of how children react with the physical environment of school. An exception is the research of Ann Skantze.

Using essays and interviews with children, Ms Skantze has identified ways in which pupils apprehend, take control of and use their environment. She has identified four types of interaction, which she calls:

- "disclosing possibilities for action;
- constructing atmosphere;
- using all senses; and
- interpreting and eliciting answers".

Ann Skantze says that it is possible for pupils to relate in a positive way to the forms and variety of school architecture. Buildings should be "an expression of the fact that exploring and discovering is an important part of obtaining knowledge".

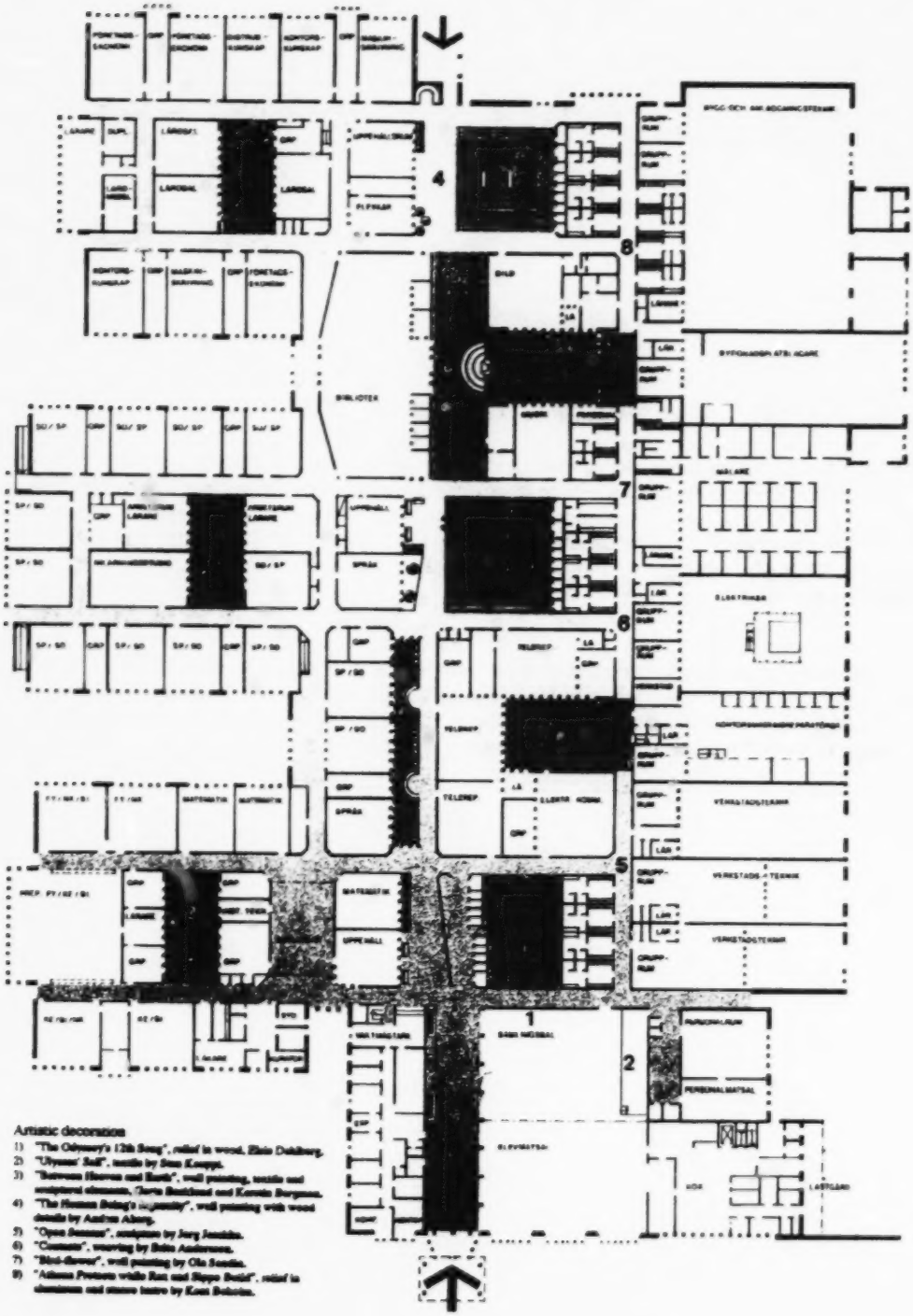
Activities within schools have educational and social aspects, yet the understanding that quality in both of these is important for the working and development of schools is not fully appreciated. It is not only the 'teaching spaces' that serve to deliver the curriculum but also those other places where children spend time, and these too should receive attention.

LUGNET SCHOOL - Falun, Sweden (see plan on page 8)

An example of how the 'pupil perspective' has been taken into consideration through the design of social areas. Cloakrooms are divided into three units and seating areas for smaller groups of pupils are well distributed. These provide meeting places giving a feeling of togetherness and relaxation. Adjacent to the library, for example, there is a large lounge with seating provided around a large fireplace. Note also the clear system of communication and the positioning of artistic decoration within the school.

The building consists of a single storey. A main corridor connects the two pupil entrances. This is intersected by minor corridors connecting the lecture rooms. These rooms are divided into three wings, one for natural sciences, one for languages, and one for economics courses. Teacher workplaces are in centrally-located rooms within each subject area. Lugnet School offers two and three-year study programmes at upper secondary level and has an enrolment of 1300 pupils.

LUGNET SCHOOL - Falun, Sweden



Artistic decoration

1) "The Odyssey's 12th Song", relief in wood, Ekin Dahlberg.
2) "Ulysses' Sail", textile by Ann Kaupp.
3) "Between Heaven and Earth", wall painting, textile and sculptural elements, Anna Backlund and Kerstin Bergman.
4) "The Human Being's [illegible]", wall painting with wood details by Anders Aberg.
5) "Open Secrets", sculpture by Jorg Jacobs.
6) "Creation", weaving by Britt Andersson.
7) "Bird-flower", wall painting by Ola Sandin.
8) "Athena Protects while Ran and Rippe Build", relief in aluminum and stoneware batter by Kaan Bohman.

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APPROPRIATION OF SPACE

As already remarked, the growth of government has, in general, led to the institutionalisation of education. An aspect of this is separation of decision-making as regards education ('what takes place in schools') and building, the physical setting for these activities. Alterations and additions to buildings are often planned and carried out without full consideration of any educational aims and implications. The process is bureaucratic as well as being different from that, say, relating to curriculum matters. Those in 'education' may see it as tediously time-consuming, while a failure by decision-makers to appreciate the part buildings play in learning helps foster the distinction between capital and running costs in education. Not seen as relating to learning, as such, the former may come to be regarded as an economic burden.

This situation is being questioned as a result of the increasing interest in the issue of the control and use of the built environment. Seminar participants argued that the appropriation, or 'sense of ownership', of space was a decisive factor in the integration of school buildings and teaching. One group said: "The building and the grounds of the school, their uses and development, should be the concern of, and involve, both teacher and the taught. Ideally their activities should be such that the whole school environment should have an atmosphere which supports learning and of which all those associated with the school can be proud."

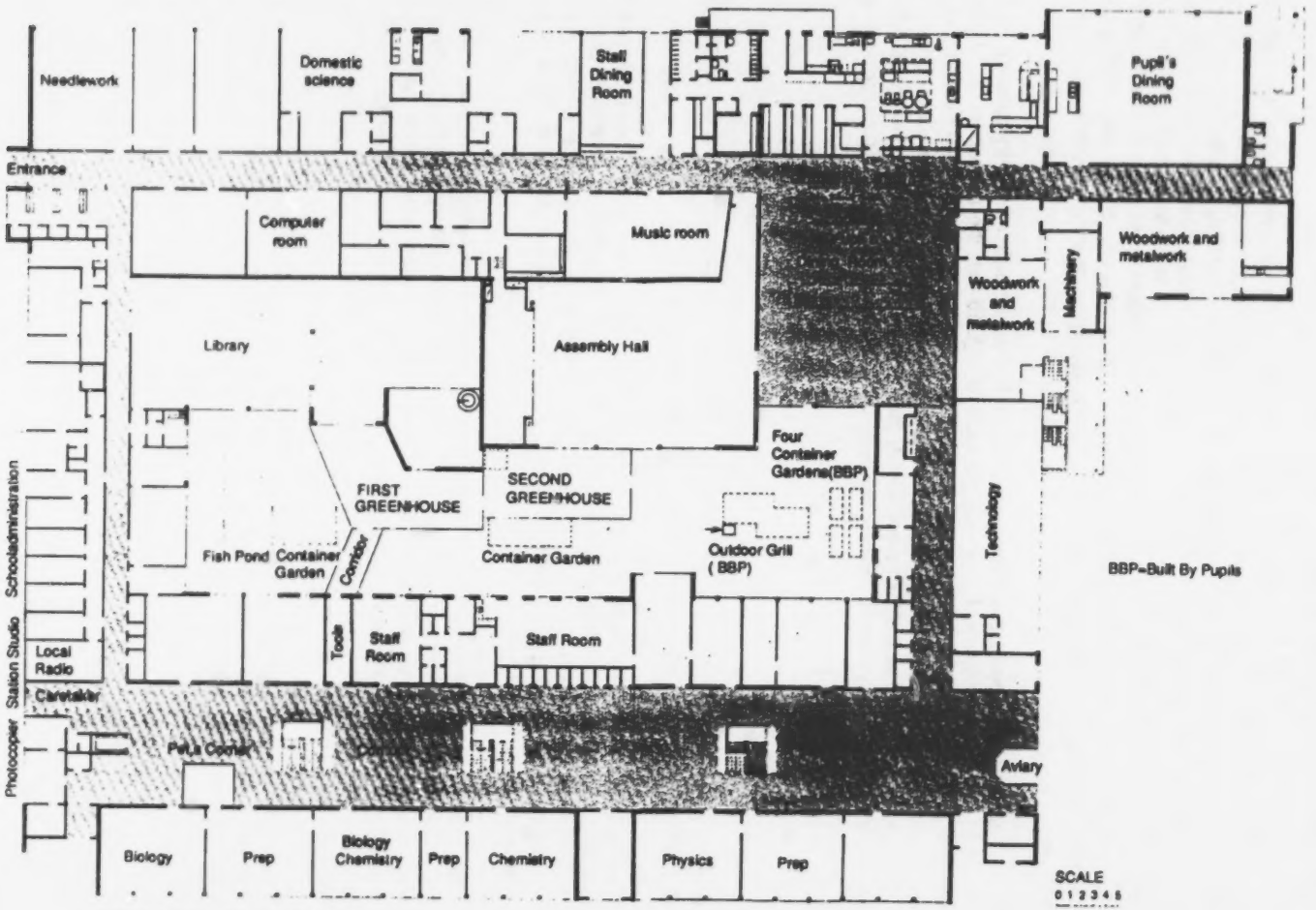
STORVRET SCHOOL - Botkyrka, Sweden (see plan on page 10)

If school buildings are to be seen as an integral part of the educational process, then the possibilities that they offer in supporting learning have to be appreciated and developed. At Storvret School the staff and pupils have arranged 'activity weeks', improving and enhancing the quality of school buildings and the working environment. Pupils have sewn new curtains for classrooms and made and painted new window sills.

The school corridors are furnished with sturdy tables and benches; the playgrounds with swings and basketball nets - all made by pupils. New rooms have also been built by staff and pupils working together. These house an aquarium and vivarium, an aviary and two large greenhouses placed in the atrium courtyard. Other features include fish ponds, cultivating beds for market garden produce and a local radio station and recording studio which broadcasts a 150-minute programme every week on the local wave band.

Storvret School is located in a typical suburban area, south-east of Stockholm. It comprises lower, middle and upper schools (age 7 -16) and has an enrolment of 1 450 pupils. About one-third of local inhabitants are immigrants to Sweden.

STORVRET SCHOOL - Botkyrka, Sweden



Arkitekt: Bonstadt–Heineman AB, Kungälv

II. What are the characteristics of a successful school building?

Discussion

DESIGN AND PLANNING

A school environment, including its physical aspects, reflects educational needs at the time of its creation. These will change with time, and with them the characteristics of a 'successful' school building. The initial phases in its life, however, are all important: the design and preparation of the building for its coming use will influence the future of the school and its surroundings; it can offer opportunities for development and have far-reaching effects.

If the brief produced by the planning department of the commissioning authority is insufficient or incorrect, and unless the architect can help to rectify or complement this brief, the result is certain to be deficient. The characteristics of a successful school building may well be decided at this early stage.

One speaker posed the question: "For whom does the architect work?" When designing a school the normally complex relationship between architect and client becomes even more involved. Who is the client? Is it central or local government (and, if so, is it the planning or education committee)? Is it the construction company, with its own methods and experience? Is it the user, with his or her own values and needs? With the multi-purpose use that school buildings can now be required to meet, this list could be much longer. The architect's brief, while all important to the end result, can be a difficult document to put together.

A supplementary question is: "For whom do we design and build?" To be able to select and prioritise educational qualities, it is necessary to establish who is the client and the user. As with other building projects, these are not the same and, if educational aims are not clearly stated and defined, disagreements and misunderstandings regarding priorities and other questions will occur.

The number of people involved in the planning process can be considerable and it should be remembered that many of the interests they represent, and the priorities of those interests, will change during the life of a school. Seminar participants felt it was essential to study and try to satisfy the needs of all these groups, in spite of the necessary broadening of the concept of 'educational qualities' that this entails. 'Full educational quality' could only be achieved by taking into account, and establishing a balance with regard to, these differing design requirements.

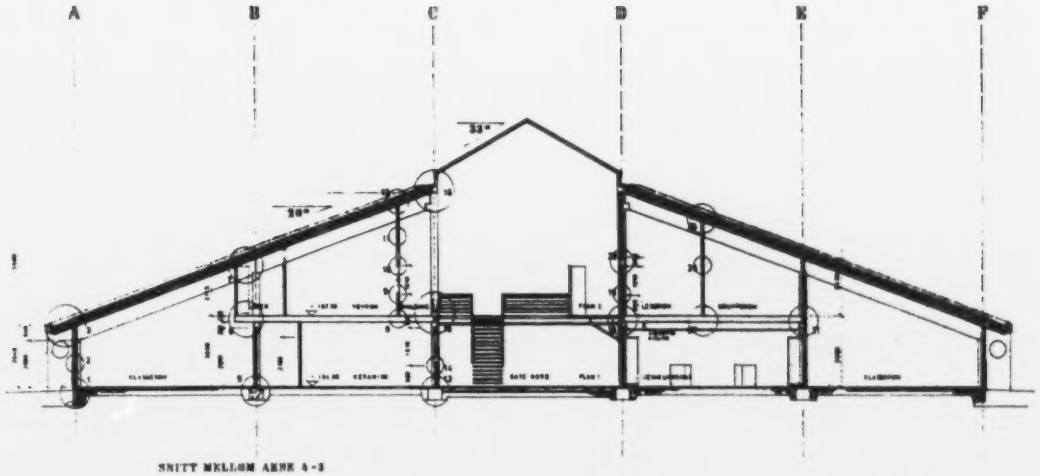
Participants accepted that the main function of a school building and its grounds was the delivery of the curriculum. Thus, design should have the flexibility to allow a range of teaching methods and learning styles. However, by integrating the school with the neighbourhood and community, it can also become a "focal point of culture, creativity and competence, promoting a climate for integration, a place for exchanging needs and experience".

The integration of school and neighbourhood, which has a historical place especially in smaller communities, is being looked at afresh. Falling pupil enrolments and the need for more economical use of space are factors behind this. Another is the trend towards greater community representation on school governing bodies.

LOFSRUD SCHOOL - Oslo, Norway

The use of glass roofing over areas of communication, creating covered 'streets' and courtyards, has become increasingly popular in Scandinavia. Such solutions not only improve climatic conditions between different buildings but supply social areas which can be used by pupils and teachers, and facilitate integration with the community as a whole. From these covered areas access can be arranged to rooms and special facilities within the school which are available to the general public. These include meeting places, exhibitions, church services and drama performances.

The Lofsrud School, in Oslo, was opened in 1988. A curved glass-covered 'street' connects the two main entrances, and this walkway is the central nave in the building complex. There the 'street' bends and changes direction, a plaza is formed. Along the 'street' the teaching areas are gathered in six houses all marked with individual design and colours. The rooms lie on both sides of the 'street', which also contains a recess area and working places for smaller groups. There is also a multi-purpose area, used for theatre, meetings and exhibitions.



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SPACE BECOMES A PLACE

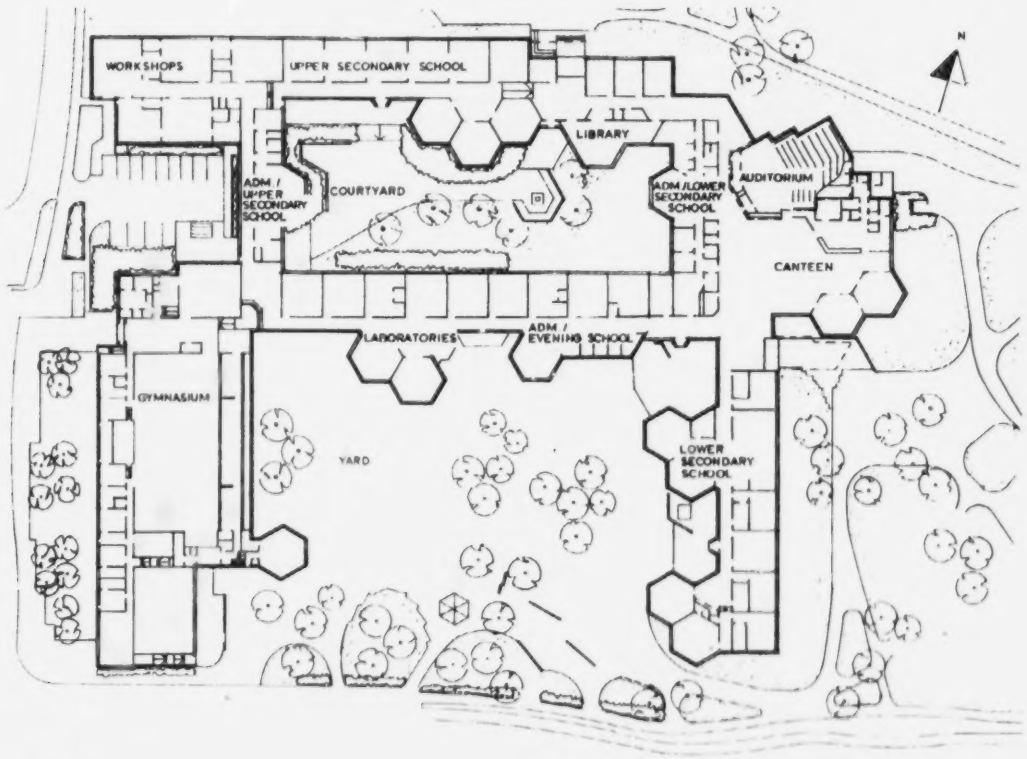
The physical environment taken as an entity can be said to be a series of inter-related spaces, limited and defined by surrounding elements. When pupils and teachers occupy these spaces they introduce a new dimension by the activity that they carry out and by the corresponding boundaries they perceive and establish. Thus, space becomes perhaps a place; the impersonal three-dimensional expanse becomes a personal or shared environmental experience. This transition is important if environmental quality is to be achieved. It does not always occur and, consequently, the 'appropriation of space' does not take place.

One seminar group argued that "to distinguish between the internal and external environment is arbitrary and can lead to the internal environment being treated as a separate entity". Instead, other distinctions could be made, and the group suggested four 'dimensions' in which work could be done simultaneously to improve the quality of the environment. These 'dimensions' were:

- pedagogical - a spatial layout reflecting the education it serves;
- affective - the user appropriation of space;
- social and cultural - indicating the relationship between the educational process and the 'collective memory' inherent in the site (and its relationship to the wider urban environment); and
- aesthetic and cultural - symbolic aspects and cultural influence.

TAPIOLA SCHOOL - Tapiola Garden City, Finland

Tapiola was designed to a human scale, where individuality and closeness to nature were the main considerations. One of the special characteristics of the school is its adaptation to surrounding nature. Trees grow near the walls, in courtyards and in front of the main entrance. Landscaped areas surround the school and provide places for study and leisure. The school building contains hexagonal classrooms.

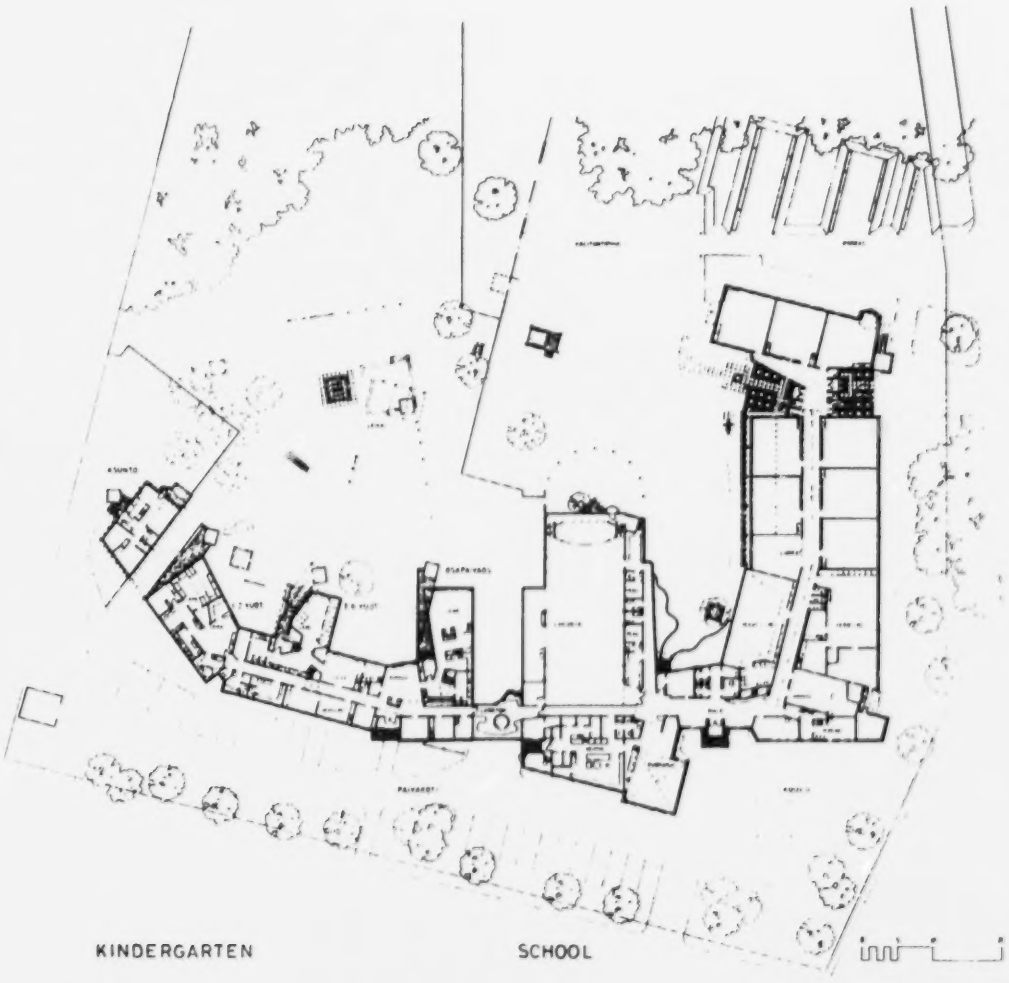


The seminar also discussed specific spaces within schools, such as those used for teaching and for 'social interaction'. One point made was that building design needed to consider the age of pupils. The needs of younger and older pupils were clearly different but allowing for this in design was hindered by the general lack of information about how children of all ages react to the physical environment of schools.

The question of scale was of obvious importance but was often ignored in the quest for rationalisation and standardisation. As one group put it: "The places provided for pupils, whether internally or externally, should recognise their changing physical needs and their changing perception of the world around them."

KNUUTILANKANGAS SCHOOL - Oulu, Finland

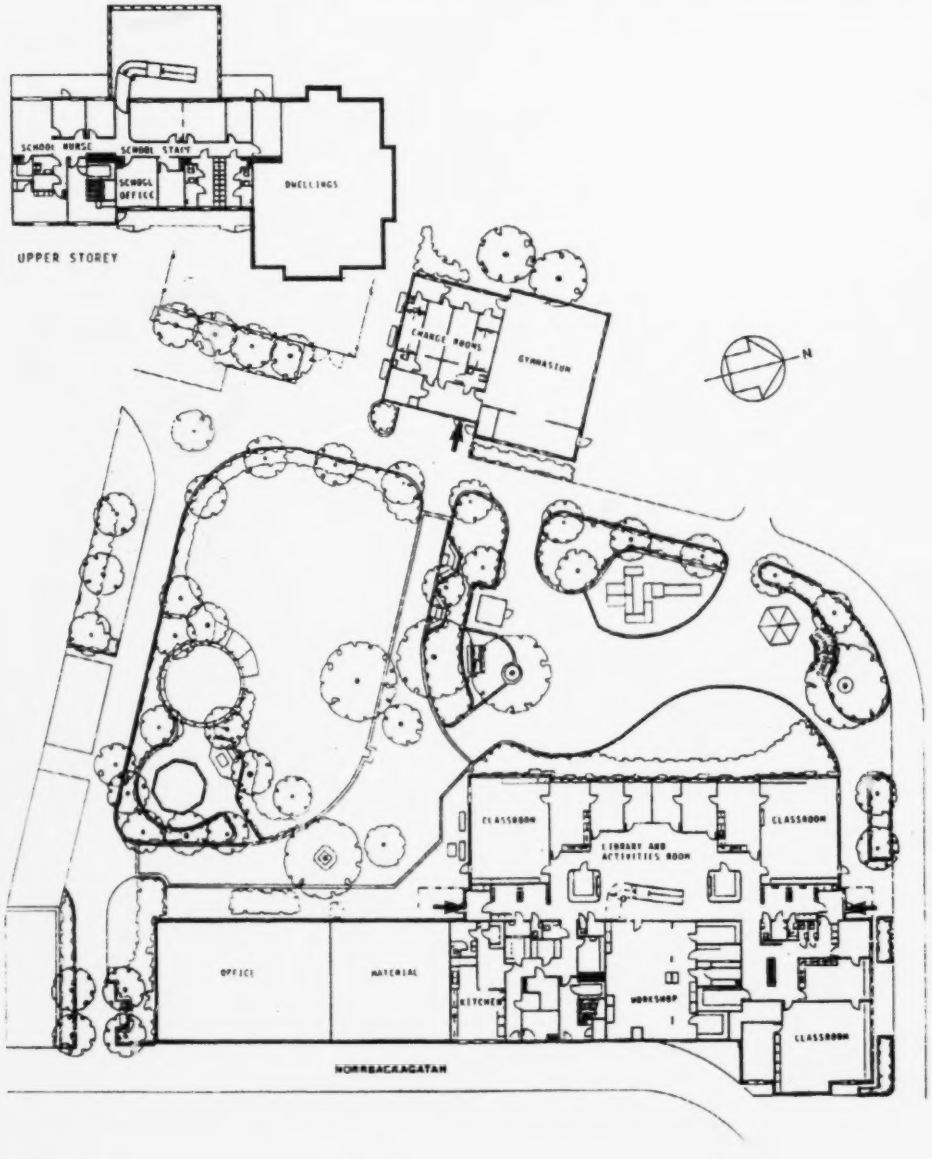
Located in Oulu, Finland, the school contains a junior section for 220 children aged 7-12 and a kindergarten for 60 younger children. The building was designed to provide each group of the under-sevens with their own yard and a separate yard for the older pupils. These outdoor spaces open out to form a common area. The buildings supply a 'shield' and offer a variety of sheltered spaces. A conscious attempt has been made to avoid harshness and regularity in the layout of the rooms, which vary greatly in their design details and also in scale. The aim has been to create a building that will offer the child space, light, form and scale so as to assist in learning and to stimulate imagination.



KARLSBERG SCHOOL - Stockholm, Sweden

Karlsberg is typical of a new type of school building in Sweden, where the junior section of the school is integrated with a recreational centre. At the end of the school day there is the possibility either to stay at the school or to attend the centre. Previously these two functions had been placed in separate buildings. Now, primarily to save costs, they have been integrated.

The school was opened in 1986 and occupies part of the bottom floor and the first floor of a new six-storey apartment building in the inner city of Stockholm. The local school board leases the premises.



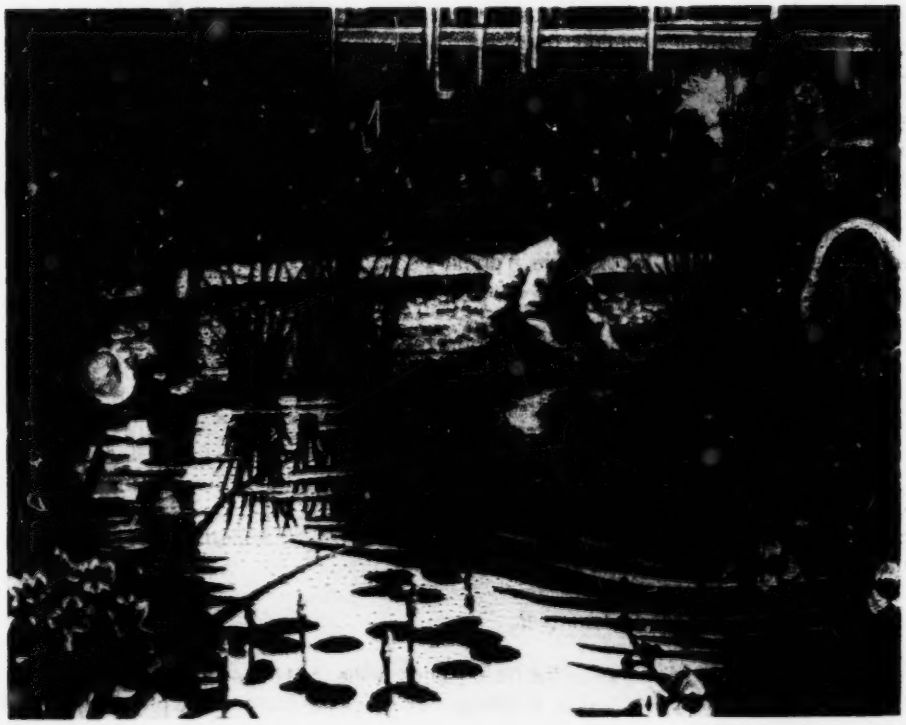
There is growing awareness of the importance of social areas in schools. This goes beyond the traditional requirements of rooms in which pupils and teachers can meet and eat, and stems from the view that an overall atmosphere needs to be created in which pupils can identify with, and feel 'ownership' of, the environment in which they study and play.

One view expressed was that social space should provide places "for quiet contemplation and for formal and informal play... A variety of places are needed, both inside and outside the school, where children can meet together in groups, sometimes small and sometimes large. Such spaces need the characteristics which provide a welcome, and promote a feeling of belonging... of ownership".

"Learning through Landscapes" project - United Kingdom

The Learning through Landscapes project aims to heighten the awareness of Local Education Authorities officers, school governors, parents, heads and teachers in schools, of the teaching and learning potential which exists in the school landscape.

The project, established through a partnership between the Department of Education and Science, the Countryside Commission and 12 Local Education Authorities, maintains that the school and its grounds should provide a complete environment for learning. Due attention should be given to the landscape as it is a valuable asset which can provide a rich and stimulating resource and setting. The grounds should provide for play, the foundation of many learning processes. In general, the quality of the school environment should inspire a sense of belonging and pride amongst pupils.



It was also suggested that teachers responsible for "spaces for teaching and learning" should strive to make them "exciting and stimulating and be prepared to develop and re-develop them". This underlines the need to design buildings so that they are adaptable.

Overall, it was argued that movement within the school should not consist of a series of isolated experiences but offer "a conscious and perceptible environmental exchange". Communication or circulation areas have tended to be regarded as 'low status space'; for economy they have been eliminated and integrated into teaching areas, often with disastrous consequences in terms of noise and disruption. The need for quick and effective communication within schools is important where complex curricula and timetables necessitate a lot of movement.

Four aspects of quality

Rational building solutions and the functional needs of the curriculum should not preclude the values that good architecture and design can give to a school. Issues of building on a human scale and of creating a variety of different types of spatial areas have been mentioned. Generally, issues could be presented in four groups.

i) A school is a functional environment.

Good design will organise space efficiently and flexibly, and allow for adaptation to different uses, groups of users (children and adults) and changing circumstances (such as significant increases or decreases in pupil enrolments). Rooms and areas within the buildings and grounds will be easily identifiable in terms of their use.

Design will take into account the needs of children and adults with physical handicaps, and will allow for a variety of sound and lighting conditions. These are not simply technical issues but should be considered also in terms of the need for different types of social environment. Other more strictly technical issues concern heating, ventilation, the use of suitable (non-toxic and allergy-free) materials and other aspects of 'safety'.

ii) A school is a learning environment.

Spaces should be created which foster the social and psychological conditions in which learning is most likely to be successful, for example in primary schools by creating 'home base' areas for each class unit so as to encourage a feeling of security among young pupils.

Similarly, areas, particularly those outdoors, should promote observation and exploration as well as offering opportunities for formal and informal play.

iii) A school has an aesthetic dimension.

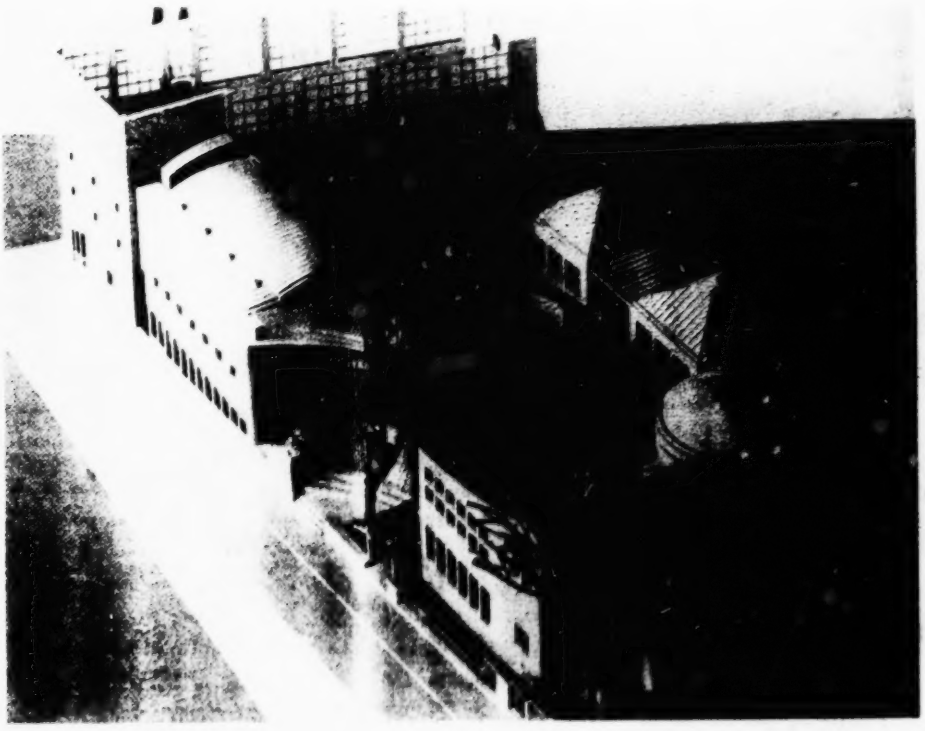
Buildings are visual objects, as such they can be stimulating both in terms of their intrinsic design and their use, for example to display art (particular spaces may be set aside for such displays). Use of colour and texture and of the blending of the old and new can play an important role in encouraging an imaginative and creative response to the environment.

iv) A school is part of its wider environment.

Successful design will enhance the history and traditions of the school as an institution, utilise and create a harmony with the local ecology and complement the surrounding physical environment.

GANZTAG SCHOOL - Vienna, Austria

Located on a small, steep site in Vienna, the school features open air areas for breaks and sports located on the roofs of buildings. The building is situated in an area where closely built-up housing merges into more spacious, detached properties. The school design seeks to reflect this transition, with a fairly compact building of large volume towards one end of the site and a loosely built-up area, featuring trees, at the opposite end.



III. What can be done to maintain and improve quality?

Discussion

Many countries are discovering that a large proportion of their education budget devoted to school premises is being spent on maintenance. Money for refurbishment or new building is scarce. Yet, a great number of schools currently in use were designed a long time ago; they reflect the values and needs of those times. What can be done then to adapt these schools to changing needs, so that they can make a greater contribution to the achievement of quality in education?

One seminar group pointed out that "evaluation is a means of identifying needs". Policies for evaluation would include assessment not only of technical issues but also educational and social aims. Such assessment should relate to the initial (design) brief and be carried out by users.

Another group referred to school development plans, a requirement being introduced in Sweden. Each school has to produce such a plan, setting out its goals, by which it is possible to measure progress and identify areas requiring further attention. This could provide a structure for the on-going evaluation of the physical environment and its contribution to these goals.

Similar was the suggestion of another seminar group for a 'framework of development'. This would contain a code for building users including guidance on methods to update policies and make changes in the curriculum, and define levels of delegated responsibility. The aim would be to ensure that standards set are capable of being applied to rebuilt and remodelled accommodation, and that the aims set out in such policies of frameworks are flexible, creative and sensitive to educational goals.

Generally, it was felt that there was lacking "an awareness of the potential of an environment and the resources it represents". This could be rectified, it was argued, through staff development and training in issues concerning the environment, including architecture and design. "By raising such standards amongst teachers, they will impart this knowledge to their pupils who, in later life, will apply this understanding in their own environment and demand understanding and application of it for their children."

Conclusion

The background to the problem of educational and environmental quality is an ever-increasing rate of change in educational and social policies, and in teaching methods and curricula, where values and priorities are having to be adjusted and new requirements introduced.

We see the school building striving to meet and satisfy these changes by taking on new forms, while we are often uncertain if these solutions are correct. The necessity to define overall and long-term aims becomes essential, thus allowing the educationist, the planner and the architect to look ahead beyond the requirements of the present day.

The importance of the design brief, both for new schools and for adaptations and rebuilding, becomes apparent. The present planning, design and building process is still aiming at a finished product. The school, when completed, is handed over to the teachers, staff and pupils and then is often, more or less, forgotten until the need for maintenance arises.

The Stockholm seminar defined education as a dynamic process, requiring premises to match. They did not agree that generality of design, form and function was the best solution; there should be a continuous updating process.

It was considered that the environmental and architectural requirements of schools were those of clearness and quality of expression, of space and rooms not only taking care of teaching needs but of supporting the 'hidden curriculum' and the social aspects of a child's development. Thus space through appropriation becomes a place - "an expression of the fact that exploring and discovery is an important part of obtaining knowledge".

To obtain and to maintain this quality requires changes in the planning process. The system of standard solutions steered by regulations, previously relied upon, is no longer acceptable. Decentralisation of responsibility should, with time, create an individual treatment of problems related to each school and place. The changeable educational and social requirements underline the necessity of pre-planned adaptability of buildings. Adaptability allows the building to meet the need for change, whilst generality, at its best, can only be a compromise.

The current rate of change demands the development of evaluation systems capable of sensing evolving needs. The users of the building, the staff and pupils, are themselves evaluators - and who better? They should be assisted and trained in understanding the possibilities buildings can offer. A simple, effective autonomous assessment system could be developed and, released from the restrictions of standardised regulations, each school could work with its own specialised 'framework for development'.

Here the architect has a role to play. Instead of handing over design responsibility at the initial stage, the architect should be given back the traditional duty of following the actual building of the school on site - an essential part of the 'responsibility of design'.

The architect can and should assist officials from the local (education) authority and the staff of the school in the continual evaluation of premises, advising on the possibilities and pre-planned adaptability existing in the school and the best and most economical ways to bring about change. Such a system would also have the advantage of immediate assessment and feedback, thus helping to achieve quality through a continuous process.

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